

## APPENDIX H

### NCTCOG SUBMITTAL OF ON-ROAD AND NON-ROAD MOBILE EMISSIONS REDUCTIONS BENEFIT

Appendix H represents the local commitment for on-road and non-road mobile emissions reductions. This appendix includes several items, as follows:

- (1) Letter dated September 15, 2006, to the TCEQ, in which the NCTCOG submitted the mobile emissions reduction benefit commitment for the nine-county DFW nonattainment area. The letter encloses two attachments, as follows:
  - a. TCM document for inclusion into the narrative portion of this SIP revision.
  - b. VMEP narrative for inclusion in this SIP revision as an appendix. (Replaced with Item 4, below, in this SIP revision)
- (2) Letter dated February 16, 2007, to American Airlines, in which NCTCOG conveys its commitment to make up any shortfall in Aviation Efficiencies targets within the VMEP commitment.
- (3) Letter dated February 16, 2007, to Southwest Airlines, in which NCTCOG conveys its commitment to make up any shortfall in Aviation Efficiencies targets within the VMEP commitment.
- (4) ***NCTCOG Revised Voluntary Mobile Emission Reduction Program (VMEP) document*** – a revised VMEP narrative document that reflects changes made to the Aviation Efficiencies section of the document, based on the agreements described in Items 2 and 3 above, between NCTCOG and the airlines. This document replaces the initial VMEP document submitted by NCTCOG, described in Item (1)b., above.

### **Appendix H, Item 1**

Letter dated September 15, 2006, to the TCEQ, in which the NCTCOG submitted the mobile emissions reduction benefit commitment for the nine-county DFW nonattainment area. The letter encloses two attachments, as follows:

- a. TCM document for inclusion into the narrative portion of this SIP revision.
- b. VMEP narrative for inclusion in this SIP revision as an appendix. (Replaced with Item 4, below, in this SIP revision)



North Central Texas Council Of Governments

September 15, 2006

Ms. Theresa Pella  
Texas Commission on Environmental Quality  
Mail Code-206  
P.O. Box 13087  
Austin, Texas 78711-3087

Dear Ms. Pella:

The purpose of this letter is to transmit final on-road and non-road emission reduction benefit amounts for ozone attainment year 2009. The emission reduction benefits are for the North Central Texas nine-county ozone nonattainment area. The North Central Texas Council of Governments (NCTCOG) staff is working closely with your staff to ensure accurate photochemical modeling of mobile emission reduction strategies and corresponding emission reduction benefits to produce quality modeling and comply with both Implementation Plan and Conformity requirements. The enclosed emission reduction benefits apply only to analysis year 2009 and cannot be projected for future emission reduction amounts. As the Regional Transportation Council (RTC) has taken action on these recommendations, they may be considered our final submittal.

**The total of all estimated emission reductions that may be subtracted from the 2009 photochemical model emission results is 2.46 tons per day Nitrogen Oxides (NOx) and 0.82 tons per day Volatile Organic Compounds (VOC).** These benefits have been divided into different categories for proper accountability and to prevent double-counting errors, as shown in Exhibit I. The first category represents on-road Transportation Control Measure (TCM) strategies. The second category represents on-road Voluntary Mobile Emissions Reduction Program (VMEP) strategies, and the third category represents non-road VMEP strategies. Each group has been divided into both modeled and post-processed benefit amounts.

The modeled benefits are already accounted for within the 2009 On-road Emission Inventory (2009 EI) previously provided to your agency for photochemical modeling purposes. Therefore, the modeled emission benefits cannot be subtracted from the photochemical model emission results. The post-processed benefits were not accounted for in current 2009 EI modeling or photochemical modeling. Therefore, they require subtraction from the photochemical model emission results. Exhibit I documents both NOx and VOC emission benefits for proper accountability.

September 15, 2006

EXHIBIT I

<b>DALLAS-FORT WORTH NINE-COUNTY NONATTAINMENT AREA 2009 Emission Reduction Benefits</b>				
<b>Strategy Category</b>	<b>NOx (tons/day)</b>		<b>VOC (tons/day)</b>	
	<b>Modeled</b>	<b>Post-Processed</b>	<b>Modeled</b>	<b>Post-Processed</b>
<b>On-Road TCMs</b>	1.27	0.26	1.12	0.49
<b>On-Road VMEP</b>	0.43	1.19	0.28	0.08
<b>Non-Road VMEP</b>	0	1.01	0	0.25
<b>Total (tons/day)</b>	<b>1.70</b>	<b>2.46</b>	<b>1.4</b>	<b>0.82</b>
<b>Grand Total (tons/day)</b>	<b>4.16</b>		<b>2.22</b>	

The NCTCOG staff will track the final emission benefits as required to meet all State Implementation Plan requirements.

Attachments 1 and 2 are final versions of the TCM narratives and VMEP narratives, respectively, for inclusion in the State Implementation Plan. NCTCOG staff must be notified of any changes made by the Texas Commission on Environmental Quality to the program descriptions and/or emissions reductions estimates in order to properly track and document the commitments.

For questions or comments regarding the above information, please do not hesitate to contact Chris Klaus of my staff at (817) 695-9286.

Sincerely,



Michael Morris, P.E.  
Director of Transportation

LCP:cg  
Attachments

cc: Mike Eastland, Executive Director, NCTCOG  
Chris Klaus, Senior Program Manager, NCTCOG  
David B. Jodray, Principal Transportation Planner, NCTCOG  
✓Lori Pampell, Transportation Planner, NCTCOG  
2005-2006 UPWP Element 3.02 Project File

**SIP Document:**

**1.6.2.11 Transportation Control Measures (TCM)**

TCMs are transportation projects and related activities that are designed to achieve on-road mobile source emissions reductions and are included as control measures in the SIP. Allowable types of TCMs are listed in §7408 (Air Quality Criteria and Control Techniques) of the FCAA, 42 United States Code, 1970, as amended (FCAA), and defined in the federal transportation conformity rule found in Title 40 CFR (40 CFR), Part 93 (Determining Conformity of Federal Actions to State or Federal Implementation Plans). In general, a TCM is a transportation related project that attempts to reduce vehicle use, change traffic flow, or reduce congestion conditions. A project that adds single-occupancy-vehicle roadway capacity or is based on improvements in vehicle technology or fuels is not eligible as a TCM.

The North Central Texas Council of Governments (NCTCOG) has identified numerous TCMs that have been, or will be, implemented in the 9 county nonattainment area. By July 2009, these TCMs will reduce Nitrogen Oxide (NOx) emissions in the nonattainment area by 1.53 tons per day (tpd) and Volatile Organic Compound (VOC) emissions by 1.61 tpd. The table below summarizes total 2009 emissions reductions by type of TCM.

As decided by the Technical Work Group (TWG) TCM Subcommittee, through interagency consultation, a group of appendices documenting projects, following the TCM narratives, is included. Table 1 includes projects that have been implemented but the associated emission benefits are not applicable in this SIP Revision. Table 2 includes projects that have been implemented with applicable emission benefits. Table 3 is a summary table including the original number of commitments, completed commitments, and remaining commitments for each program area with associated NOx and VOC emission benefits.

**Total 2009 Estimated Emission Reductions by TCM Program**

TCM Program	Commitments (Jan 2000 – July 2009)		July 2009 NOx Benefits (lbs/day)		July 2009 VOC Benefits (lbs/day)	
	Modeled	Post-Processed	Modeled	Post-Processed	Modeled	Post-Processed
Bicycle/Pedestrian Projects	0.0 Miles	15.4 Miles	0.00	14.98	0.00	9.51
Grade Separation Projects	82 Locations	2 Locations	350.35	4.26	898.44	51.40
HOV/Managed Lane Projects	70.0 Miles	0.0 Miles	1,584.92	0.00	881.50	0.00
Intersection Improvement Projects	0 Locations	655 Locations	0.00	293.76	0.00	786.87
Park and Ride Projects	1,465 Spaces	820 Spaces	55.30	30.95	35.11	19.65
Rail Transit Projects	70.2 Miles	0.0 Miles	568.55	0.00	419.17	0.00
Vanpool Projects	0 Vanpools	216 Vanpools	0.00	168.99	0.00	113.11
<b>Total Pounds/Day</b>			<b>2,559.12</b>	<b>512.94</b>	<b>2,234.22</b>	<b>980.54</b>
<b>Total Tons/Day</b>			<b>1.27</b>	<b>0.26</b>	<b>1.12</b>	<b>0.49</b>

*\*All of the listed projects are commitments, have been approved by the transportation policy body (Regional Transportation Council), and are funded.*

*\*\*Please note that the project listing for each program area; with associated emission reductions and methodology will be accounted for in the subsequent Transportation Conformity Document(s).*

September 19, 2006

*Program Narratives:* This section describes each program area by describing the methods of how the TCM category improves air quality.

#### Bicycle/Pedestrian Projects

Projects that create and/or enhance bicycle/pedestrian pathways throughout the region serve to link individuals to alternative methods of transportation, other than driving a single occupancy vehicle. By doing so, the automobile emissions that would otherwise be released from the automobile are removed completely. In the North Central Texas region, a veloweb has been designed for use primarily by fast-moving bicyclists. The veloweb is also designed to encourage concurrent pedestrian transportation use. NCTCOG has identified 15.4 miles of veloweb projects that will be implemented in the 9-county nonattainment area by July 2009.

#### Grade Separation Projects

By separating a road or railroad track from a crossroad, idling time that would otherwise be created by intersection blockage is eliminated. With this elimination of idling, grade separations increase the efficiency of traffic flow thereby improving travel time and minimizing delay. Thus, vehicle emissions and fuel consumption are reduced. NCTCOG has identified 84 locations that will be implemented in the 9-county nonattainment area by July 2009.

#### High Occupancy Vehicle (HOV) Projects

High occupancy vehicle projects promote carpooling thereby removing single occupancy vehicles and the associated vehicle emissions released from the roadway. The increase in flow of HOV lanes offers incentive for drivers to carpool. NCTCOG has identified 70.0 lane miles of HOV projects that will be implemented in the 9-county nonattainment area by July 2009.

#### Intersection Improvement Projects

Improvements to intersections including left and/or right hand turn lanes decrease the amount of time automobiles are left idling at intersections. This decrease in idling reduces fuel consumption and vehicle emissions. NCTCOG has identified 655 intersection improvement locations that will be implemented in the 9-county nonattainment area by July 2009.

#### Park and Ride Projects

Park and ride facilities promote carpooling and vanpooling. With each occupied parking space at these locations, it can be assumed that the emissions from the vehicle parked are eliminated. Park and ride lots that also serve as transit stations are not accounted for in the analysis as it is assumed the majority of these park and ride lots contain transit riders, which are then captured in Rail Transit Projects. NCTCOG has identified 2,285 parking spaces contained in Park and Ride projects that will be implemented in the 9-county nonattainment area by July 2009.

#### Rail Transit Projects

Rail projects involve implementation of new or expanded transit services or facilities. The improvements may be accomplished for all transit modes such as buses, rail, and paratransit. The three main components of improved transit are: system/service expansion projects, system/service operational improvements, and inducements. By improving regional transit systems, an increase in opportunity is created for new passengers as well as an increase in air quality benefits. NCTCOG has identified 70.2 miles of rail projects that will be implemented in the 9-county nonattainment area by July 2009.

#### Vanpool Projects

Vanpool projects include a group of six to fifteen commuters who travel to and from the same area, have similar work hours, share the costs of operating the van, and usually meet at a Park and Ride lot at a centralized location. These projects remove the extra vehicles that would otherwise be commuting by consolidating travelers into one automobile. These projects reduce air pollution, reduce traffic

September 19, 2006

congestion, and help conserve fuel. NCTCOG has identified 216 vanpools that will be implemented in the 9-county nonattainment area by July 2009.

## **VOLUNTARY MOBILE SOURCE EMISSION REDUCTION PROGRAMS FOR THE DFW EIGHT-HOUR OZONE SIP**

This appendix is a supplement to the discussion provided in Section 4.2.4, Voluntary Mobile Source Emission Reduction Programs (VMEP).

### **Clean Vehicle Program**

#### *Background*

The development of cleaner engine technologies, coupled with cleaner fuels, has resulted in the development of vehicles that are drastically cleaner than vehicles produced even a few years ago. The North Texas region is committed to utilizing the cleanest vehicle technologies in local fleets as soon as possible. Since 1992, approximately \$45 million in federal funding has been awarded to clean vehicle projects in the North Central Texas region, including the use of over 2,000 dedicated alternative fuel vehicles. In October 2005, the Regional Transportation Council (RTC) made a commitment to further the implementation of clean vehicle initiatives by passing the Clean Fleet Vehicle Policy. This policy endorsed the Clean Fleet Vehicle Model Ordinance drafted by the NCTCOG, which established purchasing, operating, and maintenance standards designed to maximize efficiency, minimize emissions, and accelerate the acquisition of new, low emission vehicles. Furthermore, the RTC Clean Fleet Vehicle Policy specifies that future vehicle funding be reserved for government entities that adopt and comply with an ordinance similar to the Model Ordinance. It also suggests that the RTC may consider compliance with the Clean Fleet Vehicle Policy when considering other transportation funding. Entities must report to NCTCOG how they are implementing these elements through a compliance verification process. Staff anticipates that all future Clean Vehicle Program funding will be reserved for entities that adhere to guidelines similar to those stated in the Clean Fleet Vehicle Model Ordinance.

Three Clean Vehicle Programs are currently underway to accommodate changing technologies and encourage the utilization of new, cleaner vehicles in several different fleets.

#### **Clean Fleet Vehicle Call for Projects:**

Local government fleets are a large focus of the overall Clean Vehicle Program due to NCTCOG's strong relationship and participation from local governments in the region. Due to these relationships, and the understanding that local governments in the region comprise a large portion of fleet vehicles, NCTCOG issued a Call for Projects focused on public entity fleets in May 2006. Through the Clean Fleet Vehicle Call for Projects, the RTC has provided approximately \$4 million to fund clean vehicle projects to help reduce Nitrogen Oxide (NO<sub>x</sub>) emissions from public entity fleet vehicles, starting in fiscal year 2007.

#### **Clean School Bus Program and Call for Projects:**

As a local government fleet, school districts have been targeted by the NCTCOG as a part of the overall Clean Vehicle Program. These fleets are largely diesel, log high mileage, and are often 10-15 years old. For these reasons, approximately \$1.5 million has been allocated by the RTC to fund a dedicated school bus call for projects for school districts in the DFW nine-county nonattainment area.

#### **Regulated Fleet Program and Associated Financial Incentives:**

Research in the DFW region shows that regulated fleets such as taxicabs, limos, shuttle buses, and hotel/courtesy vans, have on average high vehicle miles traveled per year. These vehicles, particularly taxicabs, are often used vehicles that stay in a fleet for several years. For these reasons, the Regulated Fleet Program will allocate approximately \$1.3 Million to fund a program to encourage regulated fleets such as taxicabs, limos, shuttle buses, and/or hotel/courtesy vans, to purchase new or cleaner vehicles. This program is currently under development and has not been

finalized. Therefore, a conservative estimate of emission reductions was included in the overall clean fleet vehicle program benefit.

#### *Program Participants*

The following program participants for the Clean Vehicle Program have been or will be encouraged to apply for funds under their corresponding initiative. Outreach and education programs for these fleets will begin before each call.

#### *Clean Fleet Vehicle Call for Projects:*

Open to all public entity fleets and fleets contracted by public entities. As stated in the RTC Clean Fleet Vehicle Policy, future vehicle funding is reserved for entities that have adopted and comply with a Clean Fleet Vehicle Ordinance/Resolution. As of August 2006, 55 entities, including cities, transit agencies, and school districts, had adopted a Clean Fleet Vehicle Ordinance/Resolution.

#### *Clean School Bus Program:*

This program will primarily focus on school district fleets located in the nine-county nonattainment area and those school district fleets that are contracted with private transportation providers. In some instances, outreach and education programs will extend to some additional NCTCOG service areas in the North Central Texas region. School Districts will be asked to participate in the Clean Fleet Vehicle Model Ordinance/Resolution Program to be eligible for funds.

#### *Regulated Fleet Program:*

This program will encourage involvement from taxicabs, limo, shuttle bus, and/or hotel/courtesy van companies. A primary focus of the program will be on taxi companies and coordination with local regulatory authorities, namely airports and municipalities. Staff anticipates that these entities will also be asked to participate in a program similar to the Clean Fleet Vehicle Model Ordinance/Resolution in order to compete for funding.

#### *How the Program Works*

The total federal funding committed for the Clean Vehicle Program exceeds \$45 million. Program funding is approved by the RTC and administered by NCTCOG staff. From 2006 to 2009, NCTCOG has committed over \$6 million in federal funding to the Clean Vehicle Program.

In May 2006, the North Central Texas Council of Governments (NCTCOG) issued a Clean Fleet Vehicle Call for Projects for public fleets that would begin to fund vehicles in the 2007 fiscal year. This is a fuel neutral program that includes eligible project types such as new purchases, replacements, retrofits, repowers, and conversions of heavy-duty and light-duty vehicles. Applicants are eligible to receive 80% of the incremental cost of a clean vehicle project. Public fleets requested funding for over 600 vehicles totaling over \$21 million in requested funds.

The future Clean School Bus Program will fund replacements, retrofits, and repowers for heavy-duty school buses. The primary focus of this program will be to reduce NO<sub>x</sub>, encourage participation of local school districts in reducing emissions, and encourage the use of EPA/CARB verified technologies. An ancillary goal of this program is to educate fleets and the public about the emission benefits of reducing unnecessary idling around schools.

The future Regulated Fleet Program is still under development and currently has not determined a structured program to allocate the approximate \$1.3 million available for this program. This program will likely have an education and outreach component for public and private interests, and will likely encourage taxicabs and other regulated fleet vehicle types through education, outreach, and/or financial incentives about the benefits of new, lower emission vehicles, and advanced technologies.

#### *Activity Effects*

This program assumes no change in the activity of the affected vehicles, but estimates the change in emissions resulting from the introduction of cleaner vehicles. Response to the Clean Fleet Vehicle Call for Projects included requests for over 300 heavy duty and about 300 light-duty vehicles. Future calls for projects have been planned for regulated fleets and school bus fleets in 2007 and 2008, respectively. Project submittals to clean vehicle calls for projects routinely exceed the available funding, indicating that the participating entities are eager to continue to upgrade their fleets with cleaner technology.

#### *Emission Effects*

The various initiatives under the Clean Vehicle Program are estimated to provide a cumulative emission reduction of 0.24 tons per day NO<sub>x</sub> and 0.05 tons per day VOC.

#### *Technical Support Documentation*

Emission benefits for the Clean Vehicle Program were calculated using the methodology outlined in the Texas Guide to Accepted Mobile Source Emission Reduction Strategies, August 2003. This methodology assumes no change in vehicle activity or use, but compares the emissions of the new engine to the emissions of the old engine and calculates the emission reduction based upon the difference in these emission rates. The emission benefits for all Clean Vehicle Program initiatives will be calculated using this same methodology.

The emission reductions forecasted for the Clean Vehicle Program were calculated by estimating the cost of technologies required to generate certain emissions reductions, then dividing the allocated funding amount by the cost of the technology. For example, it was estimated that the \$1.5 million in funding allocated for the Clean School Bus Program could fund 250 retrofits that incorporate technology that would reduce emissions by 25% per vehicle.

### **Employee Trip Reduction program**

#### *Background*

The Employee Trip Reduction (ETR) Program is aimed at all large public and private employers in the region (those with 100 or more employees) and is designed to reduce employee commute vehicle trips through implementation of rideshare programs (such as vanpools), telecommuting, flexible work hour programs, transit pass subsidies, bicycling, and similar strategies known as travel demand management (TDM). As of 2006, over 3,900 large employers operate in the North Central Texas region.

The ETR program implementation is facilitated by Transportation Management Associations (TMAs). TMAs are private and public/private organizations that implement congestion mitigation strategies and work together on local transportation issues. Many are incorporated, non-profit organizations; they tend to be membership organizations made up of employers, developers, building owners, and local government representatives. Most TMAs are located in areas of dense employment and focus on the TDM programs of public and private employers. Usually, the principle role of a TMA is to involve the business community in transportation planning and to provide a forum for the private sector to impact strategy development and implementation. TMAs can be involved in a variety of transportation activities, as this non-inclusive list indicates:

- Advocacy on transit, roadway, bicycle, pedestrian, land use, and air quality issues
- Transit pass subsidy or voucher programs
- Shuttles or vanpools for employees, customers, or both
- Ridematching services and support for carpools and vanpools
- Parking management programs
- Guaranteed or emergency ride home programs
- Telecommuting/teleconferencing center(s) operation
- Employer transportation coordinator (ETC) training

- Educational, promotional, and incentive programs for alternative travel modes

By taking advantage of alternative transportation system options while partnering with transit authorities and other transportation agencies, TMAs will strengthen their influence and positive impact on mobility and accessibility around employment and activity areas.

#### *Program Participants*

The ETR program is a cooperative effort between the NCTCOG, Dallas Area Rapid Transit (DART), the Fort Worth Transportation Authority (FWTA), employers and employees in the nine-county nonattainment area, and other public and private sector organizations (in the form of TMAs). Two TMAs currently operate in the area. The Central Dallas Association operates a TMA in the Dallas Central Business District (CBD), and Downtown Fort Worth, Inc. operates as the TMA for the Fort Worth CBD. As of 2006, there is strong potential for development of a new TMA in the Richardson-North Central Expressway that could begin impacting transportation strategy implementation in that area. Although this program specifically targets large employers, smaller employers are encouraged and welcome to participate.

#### *How the Program Works*

The role of the transportation/transit authorities involved in the program has been to market voluntary TDM programs to the large employers, both in and outside of the transit service areas. One main task is assisting large employers with the initial program startup. Employers are encouraged to designate or hire an Employee Transportation Coordinator (ETC) for the company. The ETC acts as a liaison between the company and the transportation authority with the administration of the program. More importantly, the ETC markets alternative commute options to fellow coworkers. The transportation authority also provides support to the ETC and employer by offering marketing materials, ETC training and education, administering employee surveys to better determine what programs will work best at that work site, and providing information on tax credits and other incentives from which the employer may benefit.

The ETR Program has been funded by NCTCOG in the Transportation Improvement Program (TIP) for the past eight years. NCTCOG developed a set of requirements to which the program implementers must comply. One requirement is the reporting of program performance measures by the regional transit authorities. This reporting allows for the monitoring of program implementation and benefits expectation. As a result of this requirement, monthly reporting of performance measures are now received from the regional transit authorities involved in the ETR program. The Travel Demand Management/Congestion Management Process Task Force and the RTC have been briefed in the past on the progress of these programs.

#### *Activity Effects*

As of June 2006, at least 665 large employers in the Dallas-Fort Worth region are active in ETR programs, and over 126,000 employees at these companies are reducing vehicle commute trips through various means, as reported by regional transportation authorities. The degree of implementation within a company or organization varies greatly. Active ETR programs include employer-subsidized vanpools and transit passes, carpools, flexible workweeks, and telecommuting, among others. In the fall of 2006, NCTCOG will initiate an Enhanced ETR program that will include an interactive website that will allow the ETR program participant to log on and report not only their mode of transportation, but also their commute distance and commute times. This will allow staff to review more detailed information to create a more comprehensive picture of commuting patterns in the region.

NCTCOG funds a range of activities designed to enhance participation in ETR programs, including a variety of marketing activities. The continuation of marketing efforts, combined with robust employment growth and construction of alternative transportation infrastructure, is expected to produce a steady growth in employee participation in various trip reduction programs.

### *Emission Effects*

By reducing daily vehicle miles traveled (VMT), the ETR program is expected to produce an emission reduction benefit of 0.43 tons per day NO<sub>x</sub> and 0.28 tons per day VOC.

### *Technical Support Documentation*

As of June 2006, an estimated 126,273 employees are active in ETR programs, based on figures from DART and FWTa. As the additional components of the Enhanced ETR program come online, involvement is expected to continue to grow. To be conservative, ETR participation is forecasted to grow by approximately 2% per year. Thus, by 2009, the ETR program is forecasted to have approximately 134,000 participants.

Based on a region-wide estimate of average vehicle occupancy of 1.14 during the peak commute period, the 134,000 ETR participants translate into 117,545 vehicles. The average one-way home-based work (HBW) trip distance in this region, based on the NCTCOG travel demand model, is 13.28 miles. Hence, the daily VMT reduced in 2009 would be 1,560,982. To be conservative and avoid double-counting participants, only 40% of all HBW commute trips are credited. Thus, the adjusted VMT reduced due to the ETR program is 624,393. Multiplying this VMT reduction by the emission factor for each pollutant generated by MOBILE 6 will yield the corresponding emission reduction:

NO<sub>x</sub> Emission reductions:

624,393 daily VMT x 0.63 g/mile = 393,368 g/day or 0.43 tons/day

VOC Emission reductions:

624,393 daily VMT x 0.40 g/mile = 249,757 g/day or 0.28 tons/day

### **Locally Enforced Idling Restrictions**

#### *Background*

Originally established in December 2004 by TCEQ, the locally enforced idling restriction rule places idling limits on motor vehicles in any locality that signs a Memorandum of Agreement with TCEQ. The rule prohibits any person in the affected locality from permitting the primary propulsion engine of a heavy-duty motor vehicle to idle for more than five consecutive minutes when the vehicle is not in motion. This rule is effective during the typical Ozone Season from April 1 through October 31.

Certain exemptions to the rule apply for a motor vehicle that has a gross vehicle weight rating of 14,000 pounds or less, and if before September 1, 2007, does not have a sleeper berth; is forced to remain motionless because of traffic conditions; is being used by the military, emergency service, law enforcement; or as airport ground support equipment. Additional exemptions apply when engine operation is necessary to provide a power source for mechanical operation; for maintenance or diagnostic purposes; defrosting of a windshield; for heating or air conditioning necessary for passenger comfort and safety in transit vehicles (30 minute maximum); for air conditioning or heating necessary for employee health or safety while performing an essential job function related to roadway construction or maintenance; or heating or air conditioning while a driver is using the vehicle's sleeper berth for a government-mandated rest period (this subsection expires September 1, 2007). A final exemption applies to the owner of a motor vehicle rented or leased to a person that operates the vehicle and is not employed by the owner.

#### *Program Participants*

Program participants include local government jurisdictions in the nine-county ozone nonattainment area, which pass a locally enforced idling restriction within their area of authority. Indirect participants include owners/operators of heavy-duty trucks and owners/operators of load/unload sites in the nine-county ozone nonattainment area.

#### *How the Program Works*

NCTCOG has committed \$1.5 million in federal funding to heavy-duty vehicle idling reduction projects, including development of an idling restriction policy. NCTCOG staff will provide marketing and outreach to local governments promoting adoption of the TCEQ locally enforced idling restrictions rule by regional cities and counties. Such adoption may be included as a criterion or credit for future funding opportunities. NCTCOG is actively pursuing the implementation of idle reduction infrastructure and technologies to provide drivers with alternatives to idling. In addition, NCTCOG will pursue funding to support "environmental enforcement" officials. Among their other duties, these officials will monitor idling activities and could apply penalties for non-compliance.

#### *Activity Effects*

The program will conservatively reduce up to 25% of idling from class HDDV4 vehicles and heavier.

#### *Emission Effects*

The program is conservatively estimated to produce a reduction of 0.62 tons per day NO<sub>x</sub> and 0.02 tons per day VOC.

#### *Technical Support Documentation*

In January 2004, EPA released *Guidance for Quantifying and Using Long Duration Truck Idling Emission Reductions in State Implementation Plans and Transportation Conformity*, advising that "extended idling" emissions account for 3.4 percent of the total emissions calculated by MOBILE 6.2 for HDDV8a and HDDV8b vehicle classes. These two vehicle classes will be the basis for emissions reduction analysis due to the documented status of pre-implementation idling emissions. These two vehicle classes are also the main targets of the program as they are responsible for nearly 75% of on-road NO<sub>x</sub> from vehicle classes HDDV4 and heavier in 2009.

In 2009, HDDV8a and HDDV8b vehicle classes emit approximately 72.76 tons per day NO<sub>x</sub> and 2.92 tons per day of VOC. Applying the EPA guideline of 3.4%, the maximum amount of idling emissions is 2.47 tons per day NO<sub>x</sub> and 0.10 tons per day VOC. Assuming conservatively that enough localities adopt the restriction to cover 50% of the DFW nonattainment area, and assuming a compliance rate of 50%, this program can reduce NO<sub>x</sub> emissions by 0.62 tons per day and VOC emissions by 0.02 tons per day.

The impact on activity is calculated by determining percentage compliance. In this case, 100% total idling time x 50% area coverage for restriction x 50% compliance rate = 25% reduction in idling.

### **Diesel Freight Vehicle Idling Reduction Program**

#### *Background*

A variety of diesel freight vehicles contribute to the region's air quality concerns. The vast majority of freight vehicles operating in the region are diesel-powered, including on-road freight trucks, railroad locomotives and equipment at intermodal facilities. Private sector firms are actively investigating a variety of technologies that generate both private sector operational benefits and emissions reductions. NCTCOG will determine the most strategic and effective of these to implement at various locations throughout the region. Related technological strategies to be explored include auxiliary power units, generators, battery power, truck stop electrification and automatic start-up/shut down systems.

#### *Program Participants*

Program participants include companies operating diesel freight vehicles in the nine-county ozone nonattainment area.

#### *How the Program Works*

NCTCOG has committed \$1.5 million in federal funding to heavy-duty vehicle idling reduction projects, and it is estimated that at least \$1 million of these funds will be used towards the purchase of idle reduction technologies. NCTCOG will determine the most strategic and effective use of these technologies to implement at various locations throughout the region and develop one or more funding opportunities for implementation of idle reduction technologies. In addition to traditional funding methods, NCTCOG may also consider the development of a loan assistance program to diminish the barrier to implementation created by capital costs.

#### *Activity Effects*

The extent to which this program will reduce hours of diesel idling per day depends upon the technology or technologies chosen for implementation.

#### *Emission Effects*

The program is estimated to produce a reduction of 0.33 tons per day NO<sub>x</sub> and 0.014 tons per day VOC.

#### *Technical Support Documentation*

Using TCEQ's Texas Emissions Reduction Plan (TERP) methodology, NCTCOG has estimated that \$1 million would fund 0.06 tons per day of NO<sub>x</sub> reduction through truck stop electrification projects, and Environ International has estimated that \$1 million would fund 0.6 tons per day of NO<sub>x</sub> reduction through implementation of start-up/shut down technologies on locomotive engines. These two projects are a good representation of either end of the cost-effectiveness scale for a spectrum of idle reduction technologies. Applying a weighted average to these two project types, \$1 million of funding will produce a NO<sub>x</sub> reduction of 0.33 tons per day.

The TERP methodology does not estimate VOC reductions. In order to calculate this reduction, 2009 VOC emission factors for both trucks and locomotives were applied to each activity. The results showed that \$1 million would fund 0.0009 tons per day of VOC reduction through truck stop electrification projects and that \$1 million would fund 0.028 tons per day of VOC reduction through implementation of start-up/shut down technologies on locomotive engines. Applying a weighted average to these two project types, \$1 million of funding will produce a VOC reduction of 0.014 tons per day.

The degree to which the idling activity will be affected depends upon the technologies chosen for funding and implementation. For example, introduction of idling technology at truck stops could reduce truck idling by 8-10 hours per day during federally mandated rest hours. According to the June 2005 EPA document, *Locomotive Switcher Idling and Idle Control Technology*, switcher locomotives may idle up to 4,000 hours per year (11 hours per day for 365 days).

### **SmartWay Transport Partnership Demonstration Project**

#### *Background*

The SmartWay Transport Partnership (SmartWay), established by EPA in 2004, is a voluntary public-private partnership with the ground freight industry. Truck and rail freight is integral to the nation's economy; however, heavy-duty diesel vehicles are major consumers of fossil fuels and major contributors to air pollution. The SmartWay Transport Partnership promotes a variety of strategies designed to reduce energy consumption and vehicle emissions that also lead to a reduction in costs for truck and rail freight operators.

One of the current strategies is to incorporate technologies on heavy-duty diesel trucks that reduce fuel use and emissions. EPA has determined the most promising of these technologies include single wide tires, advanced trailer aerodynamics, mobile idle reduction technologies and emission control technologies such as diesel oxidation catalysts and diesel particulate matter filters. EPA has also determined that these technologies may be most effective if utilized together in an overall kit design.

Implementation of these technologies by trucking companies has been discouraged by up-front capital costs and access to affordable financing. In order to purchase these technologies, truck owners need confirmation of fuel cost savings to assure a return for their investment. Likewise, financial institutions are more willing to offer loan packages for technologies with documented financial savings. Additionally, state governments have not focused financial or other support for long-haul freight emissions as this fleet travels across state boundaries. Demonstration of fuel savings and emissions reductions gained from these technologies under real operating conditions may lead to greater investment in them, ultimately leading to greater adoption and use.

#### *Program Participants*

Program participants are trucking companies that are based in a nonattainment or maintenance area and operate in the DFW nine-county ozone nonattainment area or near the U.S.-Mexico border.

#### *How the Program Works*

The U.S. Environmental Protection Agency has awarded \$300,000 to the North Central Council of Governments for implementation of this demonstration project. Additional funds are available from NCTCOG and potentially from the Houston Advanced Research Center (HARC). Implementation is planned to begin November 2006. NCTCOG will perform the following activities to demonstrate the effectiveness of an overall SmartWay technology upgrade kit: develop partnerships with eligible trucking companies, procure and install technology on participating vehicles, collect required fuel efficiency data, evaluate fuel savings and emissions reduction, and publicize demonstration project results. Accounting for the amount of funding available, approximately 50 vehicles will participate in this demonstration program.

#### *Activity Effects*

This program assumes no change in the activity patterns of affected vehicles.

#### *Emission Effects*

The demonstration program is estimated to produce a reduction of 0.002 tons per day NO<sub>x</sub> and 0.000085 tons per day VOC.

#### *Technical Support Documentation*

The following emission reduction estimates were arrived at using a methodology provided by EPA SmartWay staff in March 2005. The national MOBILE6 NO<sub>x</sub> emission rate in 2009 for HDDV7-8 class vehicles is 0.004 tons per day per vehicle. With 50 participating trucks, the overall emissions for the group are 0.2 tons per day. EPA estimates a 10-20% reduction in NO<sub>x</sub> resulting from installation of a SmartWay upgrade kit. Using the conservative 10% emissions reduction and estimating that 10% of the mileage from these trucks will be driven in the nonattainment area, this program will produce a NO<sub>x</sub> reduction of approximately 0.002 tons per day. Likewise, the total VOC emissions for the trucks are 0.0085 tons per day and the estimated emissions reduction is approximately 0.000085 tons per day.

### **Public Agency Policy for Construction Equipment**

#### *Background*

Controlling emissions from construction equipment can be done technologically through use of cleaner engines and retrofits and operationally through better practices such as reduced engine idling. Local jurisdictions are able to assist by offering incentives, preferences or requirements in their contracting process for construction projects. NCTCOG, with local government and private stakeholder participation, will develop a public agency policy for construction equipment that addresses acquisition, maintenance, operation and verification. Adoption of this policy as ordinance by local jurisdictions will encourage use of cleaner diesel equipment, use of cleaner operational procedures and use of incentive programs such as the Texas Emissions Reduction

Plan (TERP). The program will also provide guidance and education on air quality, air pollutants, technology implementation and operation to affected fleets.

#### *Program Participants*

Program participants include local government jurisdictions in the nine-county ozone nonattainment area, which adopt contracting practices within their area of authority to encourage cleaner use of construction equipment. Indirect participants include owners/operators of construction equipment in the nine-county ozone nonattainment area.

#### *How the Program Works*

NCTCOG anticipates committing \$250,000 in federal funding towards development of a public agency policy for construction equipment. NCTCOG staff will provide marketing and outreach to local governments promoting adoption of clean construction contracting processes. Such adoption may be included as a criterion or credit for future funding opportunities.

#### *Activity Effects*

Use of clean technology assumes no change in the activity patterns of affected vehicles. The program may reduce up to 10% of idling from construction equipment in the DFW area.

#### *Emission Effects*

The program is estimated to produce a reduction of 0.056 tons per day NO<sub>x</sub> and 0.0073 tons per day VOC.

#### *Technical Support Documentation*

As this program does not provide funding for cleaner equipment, emissions estimates do not account for implementation of cleaner technology such as engine replacement, repower or retrofit. This is also to avoid claiming credit that may be due to other incentive programs such as TERP. Emission reduction estimates were based upon idling reduction as the main operational improvement.

Analysis of this measure is based upon time in idle and relative emissions rates while at idle, provided by Environ International. Based on the EPA test procedure for non-road engines, it is estimated that construction equipment is at idle 15% of total operational time. Using emission results for a Tier 1 engine, the idle emissions are responsible for 1.4% of total engine emissions. Not all engines operate with the same profile, but this example was used as a representative case for construction equipment. Applying the 1.4% idle emission reduction percentage to the 2009 construction equipment inventory of 40 tons per day, the maximum amount of idling emissions is 0.56 tons per day NO<sub>x</sub>. Assuming that 40% of the emissions can be attributed to public agency construction versus private construction, assuming that enough localities adopt the policy to cover 50% of the DFW nonattainment area, and assuming a compliance rate 50%, this program can reduce NO<sub>x</sub> emissions by 0.056 tons per day. In a similar manner, a reduction in VOC emissions is expected to be 0.0073 tons per day.

The impact on activity is calculated by determining percentage compliance. In the conservative case, 100% total idling time x 40% public vs. private x 50% area coverage for policy x 50% compliance rate = 10% reduction in idling.

#### **Aviation Efficiencies**

##### *Background*

This strategy includes implementation of a variety of fuel and operational efficiency measures by airports and airlines, which can translate into emission reductions for the region. In recent discussions, the local aviation industry highlighted several measures that are currently in practice or planned for future operations. These include:

- Additional electrification of ground support equipment (GSE)
- Gate electrification to eliminate use of aircraft auxiliary power units (APU)
- Ground tugs for pushback to minimize use of reverse thrust from main aircraft engines
- De-peak of airline flight schedules
- Implementation of Airport Surface Detection Equipment, Model X (ASDE-X) which will improve efficiency during taxi and allow increased opportunity for pilots to engage in single-engine taxiing

#### *Program Participants*

Program participants include Dallas-Fort Worth International Airport with American Airlines and Dallas Love Field with Southwest Airlines.

#### *How the Program Works*

NCTCOG has committed necessary planning funds to facilitate a Memorandum of Agreement (MOA) between regional airports and airlines and TCEQ. Based upon magnitude of operations, DFW International Airport with American Airlines will be responsible for approximately 80% of the NO<sub>x</sub> emission reductions (0.76 tons per day) and Dallas Love Field with Southwest Airlines will be responsible for approximately 20% of the NO<sub>x</sub> emission reductions (0.19 tons per day). Measures to achieve the reductions will be selected by airports and airlines and may include items not discussed in this narrative. The MOAs will also include procedures for tracking and reporting implemented measures and the realized emission reductions.

#### *Activity Effects*

The extent to which this program will reduce daily idle or taxi time from aircraft depends upon the strategies chosen for implementation. Technology improvements such as GSE conversion and use of pushback assume no change in the activity patterns of affected vehicles. De-peak of flight schedules will adjust emissions throughout the day.

#### *Emission Effects*

The strategy is estimated to produce a reduction of 0.95 tons per day NO<sub>x</sub> and 0.24 tons per day VOC.

#### *Technical Support Documentation*

The target emission reduction for this strategy was calculated by estimating the benefit of the strategies for which there is available data and committing to 25% of the total potential reductions. It is assumed that the airports and airlines will be able to meet this reduction through selection of a variety of measures that will meet their operational and business needs.

Quantification for additional electrification of ground support equipment (GSE) was derived from the GSE inventories available at the time of the 2000 agreed orders between airports/airlines and TCEQ. The agreed orders claimed American Airlines contribution to GSE NO<sub>x</sub> emissions in 2007 as 4.35 tons per day and Southwest Airlines contribution to GSE NO<sub>x</sub> emissions in 2007 as 0.891 tons per day. An additional 15% in electrification results in a NO<sub>x</sub> emission reduction of 0.65 tons per day for American Airlines and 0.13 tons per day for Southwest Airlines. The total GSE reduction is 0.78 tons per day of NO<sub>x</sub>, and applying the appropriate emission factor, 0.46 tons per day of VOC.

An EPA report, *Sierra Research, Inc., Technical Support for Development of Airport Ground Support Equipment Emission Reductions, May 1999, Prepared for the U.S. EPA, Office of Mobile Sources. EPA420-R-99-007*, states that average aircraft APU emission rates vary considerably across aircrafts, but average about 93 grams of VOC and 542 grams of NO<sub>x</sub> per operating hour. The report also claims that while APU emissions cannot be completely eliminated due to their use during engine startup, APU emissions can be reduced by up to 90%, or 35-40 minutes per narrow body gate service and 55-85 minutes per wide body gate service. Southwest Airlines felt that a 15-minute reduction was appropriate for operations at Love Field, so an average of 25 minutes

(15-35 minute range) was selected for this estimate. Applying the average APU emission rate to 25 minutes results in a 225.8 gram NO<sub>x</sub> reduction and a 38.75 gram VOC reduction per event. Data from the Federal Aviation Administration obtained via TCEQ and titled *Aircraft Departures Scheduled, and Performed, by Community, Air Carrier, and Aircraft Type – 2005*, gives annual departures in 2005 for DFW International Airport as 364,468 and for Dallas Love Field as 75,614. Applying the emission reduction to annual departures, the total NO<sub>x</sub> reduction is 3.00 tons per day and the total VOC reduction is 0.51 tons per day.

The summed benefit of these two measures is 3.78 tons per day NO<sub>x</sub> and 0.97 tons per day VOC. Twenty-five percent of the calculated reduction is equal to 0.95 tons per day NO<sub>x</sub> and 0.24 tons per day VOC.

## **Appendix H, Item 2**

Letter dated February 16, 2007, to American Airlines, in which NCTCOG conveys its commitment to make up any shortfall in Aviation Efficiencies targets within the VMEP commitment.



North Central Texas Council Of Governments

February 16, 2007

Mr. Jim Walsh  
Managing Director Corporate Environmental  
4333 Amon Carter Boulevard  
MD 5274  
Fort Worth, Texas 76155

Dear Mr. Walsh:

Thank you for participating in the January 31, 2007, conference call concerning the Aviation Efficiencies strategy listed under the Voluntary Mobile Emission Reduction Program (VMEP) heading of the proposed Dallas-Fort Worth Attainment Demonstration State Implementation Plan (SIP). We feel the meeting was very productive and established the basis for a continued partnership between our two organizations. The North Central Texas Council of Governments (NCTCOG) would like to take this opportunity to reaffirm our commitment to assisting American Airlines achieve VMEP, as well as other shared air quality improvement goals.

Development of the Aviation Efficiencies strategy was based primarily on discussions with affected airports/airlines and calculated in a conservative manner. NCTCOG anticipates all parties will be able to meet the stated emissions reductions totaling 0.95 tons per day of nitrogen oxides (NOx) due to the abundance of air quality actions already being taken. However, we understand the concern that you may feel about being obligated to do so in the SIP. In order to help American Airlines meet Aviation Efficiencies targets, NCTCOG will provide any support needed to facilitate identification and quantification of applicable NOx emissions reductions. In addition, NCTCOG is in the position to offer contingency reductions in the case that all reasonable efforts to identify NOx emissions reductions from American Airlines' operations have been exhausted.

We look forward to working with you in the near future. Please do not hesitate to contact Chris Klaus at (817) 695-9286 or [cklaus@nctcog.org](mailto:cklaus@nctcog.org) with any questions.

Sincerely,

Michael Morris, P.E.  
Director of Transportation

CR:cg

cc: Chris Klaus, Senior Program Manager

### **Appendix H, Item 3**

Letter dated February 16, 2007, to Southwest Airlines, in which NCTCOG conveys its commitment to make up any shortfall in Aviation Efficiencies targets within the VMEP commitment.



North Central Texas Council Of Governments

February 16, 2007

Ms. Elaine Karnes  
Senior Environmental Specialist  
P.O. Box 36611, HDQ-1SE  
2702 Love Field Drive  
Dallas, Texas 75235

Dear Ms. Karnes:

Thank you for participating in the January 31, 2007, conference call concerning the Aviation Efficiencies strategy listed under the Voluntary Mobile Emission Reduction Program (VMEP) heading of the proposed Dallas-Fort Worth Attainment Demonstration State Implementation Plan (SIP). We feel the meeting was very productive and established the basis for a continued partnership between our two organizations. The North Central Texas Council of Governments (NCTCOG) would like to take this opportunity to reaffirm our commitment to assisting Southwest Airlines achieve VMEP, as well as other shared air quality improvement goals.

Development of the Aviation Efficiencies strategy was based primarily on discussions with affected airports/airlines and calculated in a conservative manner. NCTCOG anticipates all parties will be able to meet the stated emissions reductions totaling 0.95 tons per day of nitrogen oxides (NOx) due to the abundance of air quality actions already being taken. However, we understand the concern that you may feel about being obligated to do so in the SIP. In order to help Southwest Airlines meet Aviation Efficiencies targets, NCTCOG will provide any support needed to facilitate identification and quantification of applicable NOx emissions reductions. In addition, NCTCOG is in the position to offer contingency reductions in the case that all reasonable efforts to identify NOx emissions reductions from Southwest Airlines' operations have been exhausted.

We look forward to working with you in the near future. Please do not hesitate to contact Chris Klaus at (817) 695-9286 or [cklaus@nctcog.org](mailto:cklaus@nctcog.org) with any questions.

Sincerely,

Michael Morris, P.E.  
Director of Transportation

CR:cg

cc: Chris Klaus, Senior Program Manager

#### **Appendix H, Item 4**

***NCTCOG Revised Voluntary Mobile Emission Reduction Program (VMEP) document*** – a revised VMEP narrative document that reflects changes made to the Aviation Efficiencies section of the document, based on the agreements described in Items 2 and 3 above, between NCTCOG and the airlines. This document replaces the initial VMEP document submitted by NCTCOG, described in Item (1)b., above.

## **NORTH CENTRAL TEXAS STATE IMPLEMENTATION PLAN VOLUNTARY MOBILE EMISSION REDUCTION PROGRAM (VMEP)**

The Clean Air Act Amendments of 1990 increased the responsibility of States to demonstrate progress toward attainment of the National Ambient Air Quality Standards (NAAQS). Voluntary mobile source measures have the potential to contribute, in a cost-effective manner, emission reductions needed for progress toward attainment and maintenance of the NAAQS.

Historically, federal mobile source control strategies have focused primarily on reducing emissions per mile through vehicle and fuel technology improvements. Tremendous strides have been made resulting in new light-duty vehicle emission rates that are 70 to 90 percent less than that for the 1970 model year. However, transportation emissions continue to be a significant cause of air pollution due to population and employment growth as well as an increase in daily vehicle miles traveled (VMT) per person. Therefore, mobile source strategies that attempt to complement existing regulatory programs through voluntary, nonregulatory changes in local transportation sector activity levels or changes in vehicle and engine fleet composition are being explored and developed.

A number of voluntary mobile source and transportation programs have already been initiated at the State and local level in response to increasing interest by the public and business sectors in creating alternatives to traditional emission reduction strategies. Some examples include economic and market-based incentive programs, trip reduction programs, growth management strategies, ozone action programs, and targeted public outreach. These programs attempt to gain additional emissions reductions beyond mandatory Clean Air Act programs by engaging the public to make changes in activities that will result in reducing mobile source emissions.

Current Environmental Protection Agency (EPA) regulations stipulate that the total amount of emission reductions allowed in a VMEP may not exceed 9% of the total projected future year emissions reductions required to attain the appropriate NAAQS. The 9% cap reflects a 3% limit for on-road strategies and a 6% limit on non-road strategies. The Texas Commission on Environmental Quality (TCEQ) will determine the amount of emissions reduction equal to the 9% cap in the Dallas-Fort Worth (DFW) nonattainment area. Table I summarizes the DFW voluntary commitments under VMEP. The estimated benefits listed are calculated for the year 2009 only and may not be forecasted to estimate emission reductions for any other year. The North Central Texas Council of Governments (NCTCOG) anticipates that the emission reduction committed from the proposed VMEP strategies meets the EPA requirement of less than 9% of the total emissions reductions required.

NCTCOG staff has identified seven voluntary programs that will aid in the improvement of the North Texas region's air quality. NCTCOG, as the regional metropolitan transportation planning agency for the DFW area, commits to make a best faith effort to implement the projects and/or programs outlined in this document. NCTCOG will be responsible for monitoring and reporting the emission reductions to the commission. Any VMEP shortfall (of the total 2.63 tons per day NO<sub>x</sub> committed) will be covered by supplementing additional Transportation Emission Reduction Measures (TERMs). The program areas that may be used to remedy this shortfall are Traffic Signal Improvements; Intelligent Transportation Systems (ITS); and/or Freeway and/or Arterial Bottleneck Removal. These programs are in addition to those already credited in the State Implementation Plan (SIP).

TABLE I

NORTH CENTRAL TEXAS STATE IMPLEMENTATION PLAN VOLUNTARY MOBILE EMISSION REDUCTION PROGRAM (VMEP) EMISSION BENEFITS BY PROGRAM TYPE				
PROGRAM TYPE	2009 NOx BENEFITS (tons per day)		2009 VOC BENEFITS (tons per day)	
	Modeled	Post-	Modeled	Post-
		Processed		Processed
Clean Vehicle Program	0.00	0.24	0.00	0.05
Employee Trip Reduction	0.43	0.00	0.28	0.00
Locally Enforced Idling Restriction	0.00	0.62	0.00	0.02
Diesel Freight Idling Reduction Program	0.00	0.33	0.00	0.01
SmartWay Transport Demonstration Project	0.00	0.00	0.00	0.00
Public Agency Policy for Construction Equipment	0.00	0.06	0.00	0.01
Aviation Efficiencies	0.00	0.95	0.00	0.24
<b>TOTAL BENEFITS (tons per day)</b>	<b>0.43</b>	<b>2.20</b>	<b>0.28</b>	<b>0.33</b>

(1) NOx = Nitrogen Oxides, VOC = Volatile Organic Compounds

More information on each of the VMEP commitments follows:

### **CLEAN VEHICLE PROGRAM**

#### **BACKGROUND**

The development of cleaner engine technologies, coupled with cleaner fuels, has resulted in the development of vehicles that are drastically cleaner than vehicles produced even a few years ago. The North Texas region is committed to utilizing the cleanest vehicle technologies in local fleets as soon as possible. Since 1992, approximately \$45 million in federal funding has been awarded to clean vehicle projects in the North Central Texas region, including the use of over 2,000 dedicated alternative fuel vehicles. In October 2005, the Regional Transportation Council (RTC) made a commitment to further the implementation of clean vehicle initiatives by passing the Clean Fleet Vehicle Policy. This policy endorsed the Clean Fleet Vehicle Model Ordinance drafted by the NCTCOG, which established purchasing, operating, and maintenance standards designed to maximize efficiency, minimize emissions, and accelerate the acquisition of new, low emission vehicles. Furthermore, the RTC Clean Fleet Vehicle Policy specifies that future vehicle funding be reserved for government entities that adopt and comply with an ordinance similar to the Model Ordinance. It also suggests that the RTC may consider compliance with the Clean Fleet Vehicle Policy when considering other transportation funding. Entities must report to NCTCOG how they are implementing these elements through a compliance verification process. Staff anticipates that all future Clean Vehicle Program funding will be reserved for entities that adhere to guidelines similar to those stated in the Clean Fleet Vehicle Model Ordinance.

Three Clean Vehicle Programs are currently underway to accommodate changing technologies and encourage the utilization of new, cleaner vehicles in several different fleets.

**Clean Fleet Vehicle Call for Projects:** Local government fleets are a large focus of the overall Clean Vehicle Program due to NCTCOG's strong relationship and participation from local

governments in the region. Due to these relationships, and the understanding that local governments in the region comprise a large portion of fleet vehicles, NCTCOG issued a Call for Projects focused on public entity fleets in May 2006. Through the Clean Fleet Vehicle Call for Projects, the RTC has provided approximately \$4 million to fund clean vehicle projects to help reduce Nitrogen Oxide (NOx) emissions from public entity fleet vehicles, starting in fiscal year 2007.

**Clean School Bus Program and Call for Projects:**

As a local government fleet, school districts have been targeted by the NCTCOG as a part of the overall Clean Vehicle Program. These fleets are largely diesel, log high mileage, and are often 10-15 years old. For these reasons, approximately \$1.5 million has been allocated by the RTC to fund a dedicated school bus call for projects for school districts in the DFW nine-county nonattainment area.

**Regulated Fleet Program and Associated Financial Incentives:**

Research in the DFW region shows that regulated fleets such as taxicabs, limos, shuttle buses, and hotel/courtesy vans, have on average high vehicle miles traveled per year. These vehicles, particularly taxicabs, are often used vehicles that stay in a fleet for several years. For these reasons, the Regulated Fleet Program will allocate approximately \$1.3 Million to fund a program to encourage regulated fleets such as taxicabs, limos, shuttle buses, and/or hotel/courtesy vans, to purchase new or cleaner vehicles. This program is currently under development and has not been finalized. Therefore, a conservative estimate of emission reductions was included in the overall clean fleet vehicle program benefit.

**PROGRAM PARTICIPANTS**

The following program participants for the Clean Vehicle Program have been or will be encouraged to apply for funds under their corresponding initiative. Outreach and education programs for these fleets will begin before each call.

**Clean Fleet Vehicle Call for Projects:** Open to all public entity fleets and fleets contracted by public entities. As stated in the RTC Clean Fleet Vehicle Policy, future vehicle funding is reserved for entities that have adopted and comply with a Clean Fleet Vehicle Ordinance/Resolution. As of August 2006, 55 entities, including cities, transit agencies, and school districts, had adopted a Clean Fleet Vehicle Ordinance/Resolution.

**Clean School Bus Program:** This program will primarily focus on school district fleets located in the nine-county nonattainment area and those school district fleets that are contracted with private transportation providers. In some instances, outreach and education programs will extend to some additional NCTCOG service areas in the North Central Texas region. School Districts will be asked to participate in the Clean Fleet Vehicle Model Ordinance/Resolution Program to be eligible for funds.

**Regulated Fleet Program:** This program will encourage involvement from taxicabs, limo, shuttle bus, and/or hotel/courtesy van companies. A primary focus of the program will be on taxi companies and coordination with local regulatory authorities, namely airports and municipalities. Staff anticipates that these entities will also be asked to participate in a program similar to the Clean Fleet Vehicle Model Ordinance/Resolution in order to compete for funding.

**HOW THE PROGRAM WORKS**

The total federal funding committed for the Clean Vehicle Program exceeds \$45 million. Program funding is approved by the RTC and administered by NCTCOG staff. From 2006 to 2009, NCTCOG has committed over \$6 million in federal funding to the Clean Vehicle Program.

In May 2006, the North Central Texas Council of Governments (NCTCOG) issued a Clean Fleet Vehicle Call for Projects for public fleets that would begin to fund vehicles in the 2007 fiscal year. This is a fuel neutral program that includes eligible project types such as new purchases, replacements, retrofits, repowers, and conversions of heavy-duty and light-duty vehicles. Applicants are eligible to receive 80% of the incremental cost of a clean vehicle project. Public fleets requested funding for over 600 vehicles totaling over \$21 million in requested funds.

The future Clean School Bus Program will fund replacements, retrofits, and repowers for heavy-duty school buses. The primary focus of this program will be to reduce NOx, encourage participation of local school districts in reducing emissions, and encourage the use of EPA/CARB verified technologies. An ancillary goal of this program is to educate fleets and the public about the emission benefits of reducing unnecessary idling around schools.

The future Regulated Fleet Program is still under development and currently has not determined a structured program to allocate the approximate \$1.3 million available for this program. This program will likely have an education and outreach component for public and private interests, and will likely encourage taxicabs and other regulated fleet vehicle types through education, outreach, and/or financial incentives about the benefits of new, lower emission vehicles, and advanced technologies.

#### **ACTIVITY EFFECTS**

This program assumes no change in the activity of the affected vehicles, but estimates the change in emissions resulting from the introduction of cleaner vehicles. Response to the Clean Fleet Vehicle Call for Projects included requests for over 300 heavy duty and about 300 light-duty vehicles. Future calls for projects have been planned for regulated fleets and school bus fleets in 2007 and 2008, respectively. Project submittals to clean vehicle calls for projects routinely exceed the available funding, indicating that the participating entities are eager to continue to upgrade their fleets with cleaner technology.

#### **EMISSION EFFECTS**

The various initiatives under the Clean Vehicle Program are estimated to provide a cumulative emission reduction of 0.24 tons per day NOx and 0.05 tons per day VOC.

#### **TECHNICAL SUPPORT DOCUMENTATION**

Emission benefits for the Clean Vehicle Program were calculated using the methodology outlined in the Texas Guide to Accepted Mobile Source Emission Reduction Strategies, August 2003. This methodology assumes no change in vehicle activity or use, but compares the emissions of the new engine to the emissions of the old engine and calculates the emission reduction based upon the difference in these emission rates. The emission benefits for all Clean Vehicle Program initiatives will be calculated using this same methodology.

The emission reductions forecasted for the Clean Vehicle Program were calculated by estimating the cost of technologies required to generate certain emissions reductions, then dividing the allocated funding amount by the cost of the technology. For example, it was estimated that the \$1.5 million in funding allocated for the Clean School Bus Program could fund 250 retrofits that incorporate technology that would reduce emissions by 25% per vehicle.

## **EMPLOYEE TRIP REDUCTION PROGRAM**

### **BACKGROUND**

The Employee Trip Reduction (ETR) Program is aimed at all large public and private employers in the region (those with 100 or more employees) and is designed to reduce employee commute vehicle trips through implementation of rideshare programs (such as vanpools), telecommuting, flexible work hour programs, transit pass subsidies, bicycling, and similar strategies known as travel demand management (TDM). As of 2006, over 3,900 large employers operate in the North Central Texas region.

The ETR program implementation is facilitated by Transportation Management Associations (TMAs). TMAs are private and public/private organizations that implement congestion mitigation strategies and work together on local transportation issues. Many are incorporated, non-profit organizations; they tend to be membership organizations made up of employers, developers, building owners, and local government representatives. Most TMAs are located in areas of dense employment and focus on the TDM programs of public and private employers. Usually, the principle role of a TMA is to involve the business community in transportation planning and to provide a forum for the private sector to impact strategy development and implementation. TMAs can be involved in a variety of transportation activities, as this non-inclusive list indicates:

- Advocacy on transit, roadway, bicycle, pedestrian, land use, and air quality issues
- Transit pass subsidy or voucher programs
- Shuttles or vanpools for employees, customers, or both
- Ridematching services and support for carpools and vanpools
- Parking management programs
- Guaranteed or emergency ride home programs
- Telecommuting/teleconferencing center(s) operation
- Employer transportation coordinator (ETC) training
- Educational, promotional, and incentive programs for alternative travel modes

By taking advantage of alternative transportation system options while partnering with transit authorities and other transportation agencies, TMAs will strengthen their influence and positive impact on mobility and accessibility around employment and activity areas.

### **PROGRAM PARTICIPANTS**

The ETR program is a cooperative effort between the NCTCOG, Dallas Area Rapid Transit (DART), the Fort Worth Transportation Authority (FWTA), employers and employees in the nine-county nonattainment area, and other public and private sector organizations (in the form of TMAs). Two TMAs currently operate in the area. The Central Dallas Association operates a TMA in the Dallas Central Business District (CBD), and Downtown Fort Worth, Inc. operates as the TMA for the Fort Worth CBD. As of 2006, there is strong potential for development of a new TMA in the Richardson-North Central Expressway that could begin impacting transportation strategy implementation in that area. Although this program specifically targets large employers, smaller employers are encouraged and welcome to participate.

### **HOW THE PROGRAM WORKS**

The role of the transportation/transit authorities involved in the program has been to market voluntary TDM programs to the large employers, both in and outside of the transit service areas. One main task is assisting large employers with the initial program startup. Employers are encouraged to designate or hire an Employee Transportation Coordinator (ETC) for the

company. The ETC acts as a liaison between the company and the transportation authority with the administration of the program. More importantly, the ETC markets alternative commute options to fellow coworkers. The transportation authority also provides support to the ETC and employer by offering marketing materials, ETC training and education, administering employee surveys to better determine what programs will work best at that work site, and providing information on tax credits and other incentives from which the employer may benefit.

The ETR Program has been funded by NCTCOG in the Transportation Improvement Program (TIP) for the past eight years. NCTCOG developed a set of requirements to which the program implementers must comply. One requirement is the reporting of program performance measures by the regional transit authorities. This reporting allows for the monitoring of program implementation and benefits expectation. As a result of this requirement, monthly reporting of performance measures are now received from the regional transit authorities involved in the ETR program. The Travel Demand Management/Congestion Management Process Task Force and the RTC have been briefed in the past on the progress of these programs.

#### **ACTIVITY EFFECTS**

As of June 2006, at least 665 large employers in the Dallas-Fort Worth region are active in ETR programs, and over 126,000 employees at these companies are reducing vehicle commute trips through various means, as reported by regional transportation authorities. The degree of implementation within a company or organization varies greatly. Active ETR programs include employer-subsidized vanpools and transit passes, carpools, flexible workweeks, and telecommuting, among others. In the fall of 2006, NCTCOG will initiate an Enhanced ETR program that will include an interactive website that will allow the ETR program participant to log on and report not only their mode of transportation, but also their commute distance and commute times. This will allow staff to review more detailed information to create a more comprehensive picture of commuting patterns in the region.

NCTCOG funds a range of activities designed to enhance participation in ETR programs, including a variety of marketing activities. The continuation of marketing efforts, combined with robust employment growth and construction of alternative transportation infrastructure, is expected to produce a steady growth in employee participation in various trip reduction programs.

#### **EMISSION EFFECTS**

By reducing daily vehicle miles traveled (VMT), the ETR program is expected to produce an emission reduction benefit of 0.43 tons per day NO<sub>x</sub> and 0.28 tons per day VOC.

#### **TECHNICAL SUPPORT DOCUMENTATION**

As of June 2006, an estimated 126,273 employees are active in ETR programs, based on figures from DART and FUTA. As the additional components of the Enhanced ETR program come online, involvement is expected to continue to grow. To be conservative, ETR participation is forecasted to grow by approximately 2% per year. Thus, by 2009, the ETR program is forecasted to have approximately 134,000 participants.

Based on a region-wide estimate of average vehicle occupancy of 1.14 during the peak commute period, the 134,000 ETR participants translate into 117,545 vehicles. The average one-way home-based work (HBW) trip distance in this region, based on the NCTCOG travel demand model, is 13.28 miles. Hence, the daily VMT reduced in 2009 would be 1,560,982. To be conservative and avoid double-counting participants, only 40% of all HBW commute trips are credited. Thus, the adjusted VMT reduced due to the ETR program is 624,393. Multiplying this

VTM reduction by the emission factor for each pollutant generated by MOBILE 6 will yield the corresponding emission reduction:

NOx Emission reductions:

624,393 daily VMT x 0.63 g/mile = 393,368 g/day or 0.43 tons/day

VOC Emission reductions:

624,393 daily VMT x 0.40 g/mile = 249,757 g/day or 0.28 tons/day

## **LOCALLY ENFORCED IDLING RESTRICTION**

### **BACKGROUND**

Originally established in December 2004 by TCEQ, the locally enforced idling restriction rule places idling limits on motor vehicles in any locality that signs a Memorandum of Agreement with TCEQ. The rule prohibits any person in the affected locality from permitting the primary propulsion engine of a heavy-duty motor vehicle to idle for more than five consecutive minutes when the vehicle is not in motion. This rule is effective during the typical Ozone Season from April 1 through October 31.

Certain exemptions to the rule apply for a motor vehicle that has a gross vehicle weight rating of 14,000 pounds or less, and if before September 1, 2007, does not have a sleeper berth; is forced to remain motionless because of traffic conditions; is being used by the military, emergency service, law enforcement; or as airport ground support equipment. Additional exemptions apply when engine operation is necessary to provide a power source for mechanical operation; for maintenance or diagnostic purposes; defrosting of a windshield; for heating or air conditioning necessary for passenger comfort and safety in transit vehicles (30 minute maximum); for air conditioning or heating necessary for employee health or safety while performing an essential job function related to roadway construction or maintenance; or heating or air conditioning while a driver is using the vehicle's sleeper berth for a government-mandated rest period (this subsection expires September 1, 2007). A final exemption applies to the owner of a motor vehicle rented or leased to a person that operates the vehicle and is not employed by the owner.

### **PROGRAM PARTICIPANTS**

Program participants include local government jurisdictions in the nine-county ozone nonattainment area, which pass a locally enforced idling restriction within their area of authority. Indirect participants include owners/operators of heavy-duty trucks and owners/operators of load/unload sites in the nine-county ozone nonattainment area.

### **HOW THE PROGRAM WORKS**

NCTCOG has committed \$1.5 million in federal funding to heavy-duty vehicle idling reduction projects, including development of an idling restriction policy. NCTCOG staff will provide marketing and outreach to local governments promoting adoption of the TCEQ locally enforced idling restrictions rule by regional cities and counties. Such adoption may be included as a criterion or credit for future funding opportunities. NCTCOG is actively pursuing the implementation of idle reduction infrastructure and technologies to provide drivers with alternatives to idling. In addition, NCTCOG will pursue funding to support "environmental enforcement" officials. Among their other duties, these officials will monitor idling activities and could apply penalties for non-compliance.

### **ACTIVITY EFFECTS**

The program will conservatively reduce up to 25% of idling from class HDDV4 vehicles and heavier.

### **EMISSION EFFECTS**

The program is conservatively estimated to produce a reduction of 0.62 tons per day NOx and 0.02 tons per day VOC.

### **TECHNICAL SUPPORT DOCUMENTATION**

In January 2004, EPA released *Guidance for Quantifying and Using Long Duration Truck Idling Emission Reductions in State Implementation Plans and Transportation Conformity*, advising that "extended idling" emissions account for 3.4 percent of the total emissions calculated by MOBILE 6.2 for HDDV8a and HDDV8b vehicle classes. These two vehicle classes will be the basis for emissions reduction analysis due to the documented status of pre-implementation idling emissions. These two vehicle classes are also the main targets of the program as they are responsible for nearly 75% of on-road NOx from vehicle classes HDDV4 and heavier in 2009.

In 2009, HDDV8a and HDDV8b vehicle classes emit approximately 72.76 tons per day NOx and 2.92 tons per day of VOC. Applying the EPA guideline of 3.4%, the maximum amount of idling emissions is 2.47 tons per day NOx and 0.10 tons per day VOC. Assuming conservatively that enough localities adopt the restriction to cover 50% of the DFW nonattainment area, and assuming a compliance rate of 50%, this program can reduce NOx emissions by 0.62 tons per day and VOC emissions by 0.02 tons per day.

The impact on activity is calculated by determining percentage compliance. In this case, 100% total idling time x 50% area coverage for restriction x 50% compliance rate = 25% reduction in idling.

## **DIESEL FREIGHT VEHICLE IDLING REDUCTION PROGRAM**

### **BACKGROUND**

A variety of diesel freight vehicles contribute to the region's air quality concerns. The vast majority of freight vehicles operating in the region are diesel-powered, including on-road freight trucks, railroad locomotives and equipment at intermodal facilities. Private sector firms are actively investigating a variety of technologies that generate both private sector operational benefits and emissions reductions. NCTCOG will determine the most strategic and effective of these to implement at various locations throughout the region. Related technological strategies to be explored include auxiliary power units, generators, battery power, truck stop electrification and automatic start-up/shut down systems.

### **PROGRAM PARTICIPANTS**

Program participants include companies operating diesel freight vehicles in the nine-county ozone nonattainment area.

### **HOW THE PROGRAM WORKS**

NCTCOG has committed \$1.5 million in federal funding to heavy-duty vehicle idling reduction projects, and it is estimated that at least \$1 million of these funds will be used towards the purchase of idle reduction technologies. NCTCOG will determine the most strategic and effective use of these technologies to implement at various locations throughout the region and

develop one or more funding opportunities for implementation of idle reduction technologies. In addition to traditional funding methods, NCTCOG may also consider the development of a loan assistance program to diminish the barrier to implementation created by capital costs.

#### **ACTIVITY EFFECTS**

The extent to which this program will reduce hours of diesel idling per day depends upon the technology or technologies chosen for implementation.

#### **EMISSION EFFECTS**

The program is estimated to produce a reduction of 0.33 tons per day NOx and 0.014 tons per day VOC.

#### **TECHNICAL SUPPORT DOCUMENTATION**

Using TCEQ's Texas Emissions Reduction Plan (TERP) methodology, NCTCOG has estimated that \$1 million would fund 0.06 tons per day of NOx reduction through truck stop electrification projects, and Environ International has estimated that \$1 million would fund 0.6 tons per day of NOx reduction through implementation of start-up/shut down technologies on locomotive engines. These two projects are a good representation of either end of the cost-effectiveness scale for a spectrum of idle reduction technologies. Applying a weighted average to these two project types, \$1 million of funding will produce a NOx reduction of 0.33 tons per day.

The TERP methodology does not estimate VOC reductions. In order to calculate this reduction, 2009 VOC emission factors for both trucks and locomotives were applied to each activity. The results showed that \$1 million would fund 0.0009 tons per day of VOC reduction through truck stop electrification projects and that \$1 million would fund 0.028 tons per day of VOC reduction through implementation of start-up/shut down technologies on locomotive engines. Applying a weighted average to these two project types, \$1 million of funding will produce a VOC reduction of 0.014 tons per day.

The degree to which the idling activity will be affected depends upon the technologies chosen for funding and implementation. For example, introduction of idling technology at truck stops could reduce truck idling by 8-10 hours per day during federally mandated rest hours. According to the June 2005 EPA document, *Locomotive Switcher Idling and Idle Control Technology*, switcher locomotives may idle up to 4,000 hours per year (11 hours per day for 365 days).

### **SMARTWAY TRANSPORT PARTNERSHIP DEMONSTRATION PROJECT**

#### **BACKGROUND**

The SmartWay Transport Partnership (SmartWay), established by EPA in 2004, is a voluntary public-private partnership with the ground freight industry. Truck and rail freight is integral to the nation's economy; however, heavy-duty diesel vehicles are major consumers of fossil fuels and major contributors to air pollution. The SmartWay Transport Partnership promotes a variety of strategies designed to reduce energy consumption and vehicle emissions that also lead to a reduction in costs for truck and rail freight operators.

One of the current strategies is to incorporate technologies on heavy-duty diesel trucks that reduce fuel use and emissions. EPA has determined the most promising of these technologies include single wide tires, advanced trailer aerodynamics, mobile idle reduction technologies and emission control technologies such as diesel oxidation catalysts and diesel particulate matter

filters. EPA has also determined that these technologies may be most effective if utilized together in an overall kit design.

Implementation of these technologies by trucking companies has been discouraged by up-front capital costs and access to affordable financing. In order to purchase these technologies, truck owners need confirmation of fuel cost savings to assure a return for their investment. Likewise, financial institutions are more willing to offer loan packages for technologies with documented financial savings. Additionally, state governments have not focused financial or other support for long-haul freight emissions as this fleet travels across state boundaries. Demonstration of fuel savings and emissions reductions gained from these technologies under real operating conditions may lead to greater investment in them, ultimately leading to greater adoption and use.

#### **PROGRAM PARTICIPANTS**

Program participants are trucking companies that are based in a nonattainment or maintenance area and operate in the DFW nine-county ozone nonattainment area or near the U.S.-Mexico border.

#### **HOW THE PROGRAM WORKS**

The U.S. Environmental Protection Agency has awarded \$300,000 to the North Central Council of Governments for implementation of this demonstration project. Additional funds are available from NCTCOG and potentially from the Houston Advanced Research Center (HARC). Implementation is planned to begin November 2006. NCTCOG will perform the following activities to demonstrate the effectiveness of an overall SmartWay technology upgrade kit: develop partnerships with eligible trucking companies, procure and install technology on participating vehicles, collect required fuel efficiency data, evaluate fuel savings and emissions reduction, and publicize demonstration project results. Accounting for the amount of funding available, approximately 50 vehicles will participate in this demonstration program.

#### **ACTIVITY EFFECTS**

This program assumes no change in the activity patterns of affected vehicles.

#### **EMISSION EFFECTS**

The demonstration program is estimated to produce a reduction of 0.002 tons per day NOx and 0.000085 tons per day VOC.

#### **TECHNICAL SUPPORT DOCUMENTATION**

The following emission reduction estimates were arrived at using a methodology provided by EPA SmartWay staff in March 2005. The national MOBILE6 NOx emission rate in 2009 for HDDV7-8 class vehicles is 0.004 tons per day per vehicle. With 50 participating trucks, the overall emissions for the group are 0.2 tons per day. EPA estimates a 10-20% reduction in NOx resulting from installation of a SmartWay upgrade kit. Using the conservative 10% emissions reduction and estimating that 10% of the mileage from these trucks will be driven in the nonattainment area, this program will produce a NOx reduction of approximately 0.002 tons per day. Likewise, the total VOC emissions for the trucks are 0.0085 tons per day and the estimated emissions reduction is approximately 0.000085 tons per day.

## **PUBLIC AGENCY POLICY FOR CONSTRUCTION EQUIPMENT**

### **BACKGROUND**

Controlling emissions from construction equipment can be done technologically through use of cleaner engines and retrofits and operationally through better practices such as reduced engine idling. Local jurisdictions are able to assist by offering incentives, preferences or requirements in their contracting process for construction projects. NCTCOG, with local government and private stakeholder participation, will develop a public agency policy for construction equipment that addresses acquisition, maintenance, operation and verification. Adoption of this policy as ordinance by local jurisdictions will encourage use of cleaner diesel equipment, use of cleaner operational procedures and use of incentive programs such as the Texas Emissions Reduction Plan (TERP). The program will also provide guidance and education on air quality, air pollutants, technology implementation and operation to affected fleets.

### **PROGRAM PARTICIPANTS**

Program participants include local government jurisdictions in the nine-county ozone nonattainment area, which adopt contracting practices within their area of authority to encourage cleaner use of construction equipment. Indirect participants include owners/operators of construction equipment in the nine-county ozone nonattainment area.

### **HOW THE PROGRAM WORKS**

NCTCOG anticipates committing \$250,000 in federal funding towards development of a public agency policy for construction equipment. NCTCOG staff will provide marketing and outreach to local governments promoting adoption of clean construction contracting processes. Such adoption may be included as a criterion or credit for future funding opportunities.

### **ACTIVITY EFFECTS**

Use of clean technology assumes no change in the activity patterns of affected vehicles. The program may reduce up to 10% of idling from construction equipment in the DFW area.

### **EMISSION EFFECTS**

The program is estimated to produce a reduction of 0.056 tons per day NO<sub>x</sub> and 0.0073 tons per day VOC.

### **TECHNICAL SUPPORT DOCUMENTATION**

As this program does not provide funding for cleaner equipment, emissions estimates do not account for implementation of cleaner technology such as engine replacement, repower or retrofit. This is also to avoid claiming credit that may be due to other incentive programs such as TERP. Emission reduction estimates were based upon idling reduction as the main operational improvement.

Analysis of this measure is based upon time in idle and relative emissions rates while at idle, provided by Environ International. Based on the EPA test procedure for non-road engines, it is estimated that construction equipment is at idle 15% of total operational time. Using emission results for a Tier 1 engine, the idle emissions are responsible for 1.4% of total engine emissions. Not all engines operate with the same profile, but this example was used as a representative case for construction equipment. Applying the 1.4% idle emission reduction percentage to the 2009 construction equipment inventory of 40 tons per day, the maximum amount of idling emissions is 0.56 tons per day NO<sub>x</sub>. Assuming that 40% of the emissions can be attributed to public agency construction versus private construction, assuming that enough localities adopt the policy to cover 50% of the DFW nonattainment area, and assuming a compliance rate 50%,

this program can reduce NOx emissions by 0.056 tons per day. In a similar manner, a reduction in VOC emissions is expected to be 0.0073 tons per day.

The impact on activity is calculated by determining percentage compliance. In the conservative case, 100% total idling time x 40% public vs. private x 50% area coverage for policy x 50% compliance rate = 10% reduction in idling.

## **AVIATION EFFICIENCIES**

### **BACKGROUND**

Through consultation with representatives of the local aviation industry, the North Central Texas Council of Governments (NCTCOG) understands that airlines and airports may implement or continue to implement a variety of voluntary fuel and operational efficiency measures by airports and airlines, which can translate into emission reductions for the region. These include advances in technology, fuel-saving measures, and improvements in operational efficiencies.

### **PROGRAM PARTICIPANTS**

Program participants include Dallas-Fort Worth International Airport with American Airlines and Dallas Love Field with Southwest Airlines (the Airport and Airlines).

### **HOW THE PROGRAM WORKS**

Based on an understanding of the local aviation industry, NCTCOG believes the Airports and Airlines will implement or continue to implement voluntary strategies which will achieve the target level of emission reductions under this program. Accordingly, NCTCOG has committed necessary planning funds to quantify the emission reductions that could result from such voluntary strategies. NCTCOG recognizes that, consistent with the nature of voluntary strategies, the Airports and Airlines may choose unilaterally not to implement voluntary strategies, or to discontinue the implantation of voluntary strategies, including the strategies quantified below and/or other strategies. Therefore, NCTCOG will cover any shortfall from the estimated emission reductions by supplementing additional Transportation Emission Reduction Measures (TERMs).

### **ACTIVITY EFFECTS**

The extent to which this program will impact aircraft activity depends upon the voluntary strategies the Airports and Airlines may choose to implement. Technology improvements assume no change in the activity patterns of affected vehicles; whereas, improvements in operational efficiencies may adjust emissions throughout the day.

### **EMISSION EFFECTS**

The strategy is estimated to produce a reduction of 0.95 tons per day nitrogen oxides (NOx) and 0.24 tons per day volatile organic compounds (VOC).

### **TECHNICAL SUPPORT DOCUMENTATION**

NCTCOG's target level of emission reductions for this strategy was calculated by estimating the benefit of the strategies for which there is available data and committing to 25 percent of the total potential reductions. Although the airports and airlines may choose to implement strategies other than those quantified below, it is assumed that the airports and airlines will be able to meet the target reduction through selection of a variety of measures that will meet their operational and business needs.

Quantification for additional electrification of ground support equipment (GSE) was derived from the GSE inventories available at the time of the 2000 agreed orders between airports/airlines and the Texas Commission on Environmental Quality (TCEQ). The agreed orders claimed American Airlines projected contribution to GSE NOx emissions in 2007 as 4.35 tons per day and Southwest Airlines projected contribution to GSE NOx emissions in 2007 as 0.891 tons per day. An additional 15 percent in electrification results in an estimated NOx emission reduction of 0.65 tons per day for American Airlines and 0.13 tons per day for Southwest Airlines. The total estimated GSE reduction is 0.78 tons per day of NOx, and applying the appropriate emission factor, 0.46 tons per day of VOC.

An EPA report, *Sierra Research, Inc., Technical Support for Development of Airport Ground Support Equipment Emission Reductions, May 1999, Prepared for the U.S. EPA, Office of Mobile Sources. EPA420-R-99-007*, states that average aircraft APU emission rates vary considerably across aircrafts, but average approximately 93 grams of VOC and 542 grams of NOx per operating hour. The report also claims that while APU emissions cannot be completely eliminated due to their use during engine startup, APU emissions can be reduced by up to 90 percent, or 35-40 minutes per narrow body gate service and 55-85 minutes per wide body gate service. Southwest Airlines informed NCTCOG that a 15-minute reduction was appropriate for operations at Love Field because, on average, Southwest Airlines' aircraft are only on the ground 20 minutes between flights. To account for all operations in the North Central Texas region, an average of 25 minutes (15-35 minute range) was selected for this estimate. Applying the average APU emission rate to 25 minutes results in a 225.8-gram NOx reduction and a 38.75-gram VOC reduction per event. Data from the Federal Aviation Administration obtained via TCEQ and titled *Aircraft Departures Scheduled, and Performed, by Community, Air Carrier, and Aircraft Type – 2005*, gives annual departures in 2005 for DFW International Airport as 364,468 and for Dallas Love Field as 75,614. Applying the emission reduction to annual departures, the total estimated NOx reduction is 3.00 tons per day and the total VOC reduction is 0.51 tons per day.

Based on the calculation inputs, the summed benefit of these two measures is 3.78 tons per day NOx and 0.97 tons per day VOC. Twenty-five percent of the calculated reduction is equal to 0.95 tons per day NOx and 0.24 tons per day VOC.